2005 RAPTOR BREEDING SEASON REPORT

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Abstract: The 2005 breeding season was the 19th year of raptor monitoring at Pinnacles National Monument. Field observations began 12 January 2005 and ended 21 July 2005.

Pinnacles National Monument provides a diverse habitat for numerous cliff-nesting raptors, including sensitive species such as prairie falcons (*Falco mexicanus*) and golden eagles (*Aquila chrysaetos*), as well as a spectacular array of summits and cliff-wall routes for rock-climbers. Therefore, the behavioral and physical effect that climbers and off-trail hikers have on cliff-nesting raptors is studied.

The 2005 raptor-breeding season was successful for prairie falcons. Twenty territories were occupied with ten active-breeding prairie falcon territories confirmed. Thirty-one prairie falcons hatched, with twenty-seven possibly fledging and confirmed. One nest failed, likely due to abandonment, and three pairs occupied territories without nesting for the season.

Of particular note, a peregrine falcon (*Falco peregrinus*) pair successfully nested and fledged three young in the Hawkins territory, marking the first successful peregrine falcon nesting effort at Pinnacles National Monument in 48 years.

Golden eagles were observed throughout the park. Six nests in four known territories in the park were not occupied this year. One known nest in the Eucalyptus Grove territory outside of the park produced two eaglets. Fledging was confirmed for one of the eagle young but likely for both.

The 2005 breeding season was particularly successful for additional raptor species nesting in the park, including red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), Cooper's hawks (*Accipiter cooperii*), sharp-shinned hawks (*Accipiter striatus*), barn owls (*Tyto alba*), and long-eared owls (*Asio otus*). Red-tailed hawk pairs occupied six territories, hatched eleven young, and produced nine confirmed fledglings, with ten total fledglings likely. American kestrels occupied ten territories, with eight fledglings confirmed in five territories. Cooper's hawks were confirmed nesting in the park along the Bench Trail; a territorial pair produced five nestlings that failed due to predation. Sharp-shinned hawks were confirmed nesting near the Moses Spring trailhead and in the South Wilderness, with eight fledglings confirmed from the two territories. A barn owl pair produced four nestlings in D. Soto Canyon, with fledging unconfirmed, and three long-eared owl fledglings were documented in Grassy Canyon.

2005 also marked the second year that captive-bred California condors (*Gymnogyps californianus*) were released at Pinnacles National Monument, with up to 7 condors active from Grassy Canyon to the High Peaks throughout the season. Condors were aggressively stooped by territorial raptors including peregrine and prairie falcons, on numerous occasions, with one incident of an adult bald eagle repeatedly stooping a condor. Condors were also observed displacing turkey vultures and corvids from the Grassy Canyon feeding site.

STUDY AREA AND METHODS

Pinnacles National Monument (PNM) is located in the Gabilan Mountains of the central Coast Range of California. PNM covers 24,252 acres with Elevation ranging from 244 to 982 meters. The climate is Mediterranean with hot, dry summers and cool, damp winters. Temperatures range from a mean of 8.2˚ C in January to 22.6˚ C in July. The majority of the rainfall occurs from November to April with average yearly rainfall of 44 cm (National Oceanic and Atmospheric Administration, NOAA, 1997).

PNM provides a diverse range of habitat types for birds and other species: volcanic rock formations and outcroppings; California mixed chaparral; pine-oak woodlands; grasslands; and riparian habitats.

Survey methods followed the standard operating procedures detailed in the 2004 Raptor Monitoring Protocol for Pinnacles National Monument, California (Emmons & Fesnock).

Potential and established cliff-nesting raptor territories in high-use climbing areas and remote locations in the park were surveyed using spotting scopes (20-60x) and binoculars (10x42). Observations were made from the locations that provided the best view of an eyrie or territory. A Trimble GeoExplorer 3 GPS unit was used to plot every observation spot. Surveys typically lasted 1.5 to 6 hours, depending upon the raptor behavior and amount of data collection needed. For a survey to be classified as “no birds” a minimum watch time of 5 hours was required. Territories were revisited on a 7-21 day schedule based on visitor use, the progress and age of raptors at territories (to obtain the most critical data for each territory for that time period), and the number of territories to be monitored. High visitor use areas were monitored more frequently and during weekend days when climbers were more likely to be present. While other monitoring programs estimate fledging success at 90% fledge age (Anderson et al. 1997, Steenhof et al. 1982, Steenhof 1998), our protocol was to end surveys once all young raptors were confirmed fledged. For a territory to be classified as unoccupied, a minimum of three surveys of “no birds” confirmed over three different months was required. Survey duration was ultimately dependent upon visibility. When birds cooperated and needed data was collected in short survey duration, nearby territories were visited as well.

In January, late afternoon and evening surveys were conducted to locate territorial prairie falcons. Perching, flying, diving, interacting, and roosting locations were sought as evidence of territorial behaviors and territory establishment. By mid-January climbing advisories went into effect and territories were monitored to record courtship behaviors, territorial disputes, and disturbance. Advisories were used to inform visitors of areas likely to have breeding raptors. Generally these areas were occupied by raptors at least once during the preceding three years. Visitors were advised to avoid these areas. Advisory areas with posted signs included the Balconies, Hawkins, Scout Peak, and Little Pinnacles territories.

In late winter and early spring, copulation behavior was observed and duration quantified. Food-swapping and eyrie selection were also recorded. Surveys during this period focused on evening and late-afternoon surveys until eyrie selections were made.

Incubation of nesting prairie falcons was determined by female prairie falcons (and to a lesser extent male falcons during nest switches) flying into a nest hole and not reappearing for periods of time. Attempts to count eggs were made by surveying when the best light was available for visibility, and when the incubating falcons temporarily left the nest during food drops and nest switches. Soft incubation – the onset of incubation - was determined by a small number of eggs laid and the female incubating for short durations (15-75 minutes). Hard incubation was characterized by the adult falcons – primarily the females – incubating a full clutch of eggs for hours in duration. Surveys were done in early morning and late evening hours to catch periods of

greatest raptor activity, such as food drops, and to have a maximum amount of time for observation.

Hatched young prairie falcons were aged by physical features using an aging guide (Moritsch 1983). Hatch date was determined by counting backwards from at least two – and preferably three or more - independent agings. Nestlings were observed from late spring to early summer, primarily during early morning and evening hours when they were most active, but observation periods at midday provided further data on nestling activity while prairie falcon adults were hunting for prey away from the nest sites. From early to mid summer, prairie falcon young were observed primarily in early to mid morning hours, when they were nearing fledging and most actively exercise flapping. Full fledging of falcon young was confirmed by all young being seen perched and / or in flight away from the nest site, with fledging dates determined by the coordination and strength of flight, the size of perches, and the amount of vocalization during flight.

Weather was always an important factor. During temperature extremes, heavy fog, or rain, most birds of prey were not active and therefore monitoring was not done during these periods.

RESULTS

Prairie Falcons, *Falco mexicanus*

The first prairie falcon pair was observed at Hawkins on 12 January 2005. Twenty territories were occupied, by ten nesting pairs and three non-nesting pairs. The Tugboat territory was new and previously undocumented. The prairie falcon pair, also occupying the Mating Rocks territory, attempted to nest at Tugboat – named after a climbing route on the rock pinnacle that is southeast of the foot of Crowley Drainage – but abandoned the effort by mid-June. All other territories have been used historically by prairie falcons. Additionally, seven of the ten eyries chosen by prairie falcons were used in previous years, although the historic nest site at Drywall had not been used by prairie falcons in 17 years. The last confirmed nesting pair was documented on 11 April 2005 in the Tugboat territory. Prairie falcon nest details are listed in Table 1 below. Numbers in the "Closest Climb" column refer to climbing route numbers listed in the Climber's Guide to Pinnacles National Monument, 2nd Edition, by David Rubine (1995).

Table 1: 2005 Prairie Falcon Nest Sites

Territory	Nest Used/ Last Year Used	Sensitivity to Visitor Disturbance	Height (ft) From Ground	Height (ft) From Top	Closest Climb	Aspect
Drywall	DRY-2/ 1988	Low				SW
Narrows	NARR-2/ NEW (by PRFA)	Low	15	25	none	S
D. Soto Canyon	DS-2/ NEW (by PRFA)	Medium	25	5	none	W
Pig Canyon	PIG-3/ 2003	Low				E
Little Pinnacles	LP-2/ 1998	High				SSW
Goat Rock	GOAT-2/ 2004	High				NNE
Egg	EGG-1/ 1996	High				SSW
Tugboat	TUG-1/ NEW	Low	20	10	# 339	NE
Crowley Towers	CT-1/ 2003	High				E
North Chalone	NC-4/ 2001	Low				NE

Several prairie falcon pairs did not nest or produce young this year. Falcon pairs at Canyon North of Willow Springs and South Chalone Peak actively perched, courted, and inspected historic nest sites late in the breeding season, but did not nest at the territories. The prairie falcon pair at North Balconies actively courted, copulated, and inspected historic nest sites, but no nest attempts or behavior were confirmed. For this latter pair, human disturbance may have been a significant factor in territory occupation without nesting (see the "Human Interactions" section below).

Incubation was first observed at D. Soto Canyon on 25 March 2005. The first hatching occurred between 19-21 April 2005 at Pig Canyon. The first fledging took place from 31 May-2 June 2005, also at Pig Canyon. The last young to fledge was the single young falcon at Drywall, from 9-11 June 2005. At least thirty-one chicks were produced with twenty-seven confirmed fledging. Eggs were counted this season at the Egg and Narrows nests, with 4 eggs observed at the Egg nest, and 5 eggs documented at the Narrows nest. Eggs could not be observed at the other falcon nest sites this year, due to nest site locations and egg placement within the nest sites during incubation. Chicks were successfully counted at nine territories with a mean of 3.44 chicks per eyrie and 3 fledglings per eyrie. (See Table 2 below for the 2005 summary of prairie falcon nesting at the park.)

Table 2: 2005 PNM Prairie Falcon Breeding Summary

Territory	Nest Used/ Last Year Used	# Eggs Laid	# Young Hatched	# Young Known/ Possibly Fledged
Drywall	DRY-2/ 1988	Unknown	1	1/ 1
Narrows	NARR-2/ NEW (by PRFA)	5	4	4/ 4
D. Soto Canyon	DS-2/ NEW (by PRFA)	Unknown.	5	2/ 2
Pig Canyon	PIG-3/ 2003	Unknown.	3	3/ 3
Little Pinnacles	LP-2/ 1998	Unknown.	2	1/ 1
Goat Rock	GOAT-2/ 2004	Unknown.	3	3/ 3
Egg	EGG-1/ 1996	4	4	4/ 4
Tugboat	TUG-1/ NEW	1+	0	0 Note: Nest failed due to abandonment.
Crowley Towers	CT-1/ 2003	Unknown.	3	3/ 3
North Chalone	NC-4/ 2001	Unknown.	4	3/ 3

Prairie falcon nest productivity for the 2005 season was generally consistent with the productivity averages for the prior 18 years of monitoring data (see Table 3 below). Prairie falcons occupied 20 territories in 2005, more than 7 over the 12.0 average, and the highest documented over the 19-year study. However, this figure is shaped largely by the particular raptor monitor's awareness and interpretation of falcon behavior, and perspective on territorial boundaries. As such, interpreting meaning from this figure is difficult. The remaining statistics gathered for 2005 are more consistent with the 18-year averages. There were 10 prairie falcon nesting territories in 2005 versus the 9.32 average; 9 successful nests in 2005 versus the 7.68 average; 27 falcon chicks fledged in 2005 versus the 26.37 average; and 3.0 chicks / nest fledged versus the 3.27 average. The consistency between the 2005 season numbers and 18-year averages suggests that the 2005 season was a typical year for nesting prairie falcons.

Table 3: 1984-2005 Prairie Falcon Nesting Productivity

Year	Territories Occupied	Territories Nesting	Successful Nests	# Chicks	# Chicks/Nest
1984	10	8	8	27	3.375
1987	6	4	4	10	2.5
1988	11	9	8	24	3
1989	12	10	8	19	2.375
1990	13	11	9	35	3.88889
1991	13	11	10	31	3.1
1992	13	11	10	34	3.4
1993	13	12	10	35	3.5
1994	14	12	12	42	3.5
1995	13	11	8	24	3
1996	11	10	9	34	3.77778
1997	12	8	6	26	4.33333
1998	13	7	0	0	0
1999	10	8	6	27	4.5
2000	10	8	7	22	3.14286
2001	11	9	7	24	3.42857
2002	12	8	7	22	3.14286
2003	13	9	8	32	4
2004	18	11	9	33	3.66667
2005	20	10	9	27	3
Averages (1984-2004)	**12**	**9.315789**	**7.68421**	**26.368**	**3.27373**

Peregrine Falcons, *Falco peregrinus*

Of particular significance this year was a peregrine falcon pair that occupied and successfully nested in the Hawkins territory, marking the first time in 48 years that a peregrine pair nested and produced fledglings in the park. The peregrine falcon pair was first observed perching on H & L Dome and soaring near Hawkins on 12 January 2005. Through mid-March, the peregrine falcon pair copulated often, inspected historic nest sites at Hawkins regularly, and actively stooped other raptors in the Hawkins territory. Aggressive territorial interactions between the peregrine falcon pair and the Hawkins prairie falcon pair – which was also first seen occupying the territory on 12 January 2005 – likely led to the latter abandoning the territory, as the prairie falcon pair was not observed in the Hawkins area after 29 February 2005. The peregrine falcon pair began incubating 3 eggs at the historic HP-1 site, on 26-30 March, with all the eggs successfully hatching on 2-5 May. The 3 peregrine falcon young fledged on 13-16 June 2005, and were still actively wailing, chasing each other, and perching in the Hawkins territory as of 29 July 2005.

California Condors, *Gymnogyps californianus*

2005 marked the second year that captive-bred California condors were released into PNM, with up to 7 juvenile condors – 6 from the 2nd cohort and 1 from the 1st cohort – flying actively in the park. The condors were focused primarily near the holding pen and feeding site in Grassy Canyon through mid-January, and began taking longer flights into Bear Gulch, Condor Gulch, and the central High Peaks through April. From May to June, the condors returned to the Grassy Canyon area to perch and circle, with occasional movement into the southeast part of the park to roost overnight. Through July, the condors began to fly more actively in the central High Peaks again,

roosting there at night. Territorial interactions between condors and other raptors were observed. Early in the breeding season, golden eagles and red-tailed hawks wailed and stooped at condors in Grassy Canyon, likely due to the use of Grassy Canyon as a feeding territory for many raptors, and the close proximity of the condor feeding site with the Grassy Canyon nest site used by a red-tailed hawk pair this year. An adult bald eagle was observed stooping at a condor repeatedly as the condor attempted to fly from a ground perch. Ravens also mobbed and cawed at condors perching in gray pines on several occasions. Despite these physical interactions, no lasting physical injuries to the attacked condors were observed. The juvenile condors were also observed displacing common ravens and turkey vultures from feeding sites in Grassy Canyon. From mid-February through Mid-April, and in July, condors circling over and perching in the High Peaks were also occasionally stooped at and scolded by territorial prairie and peregrine falcons, particularly near Hawkins, but no physical injuries to condors were documented.

Golden Eagles, *Aquila chrysaetos*

Golden eagles were observed nesting at the Eucalyptus Grove outside of PNM's West Side, but no active golden eagle nesting was confirmed within park boundaries. Golden eagle adults and juveniles were active throughout the park, but no territorial occupation within the park was confirmed. Historic nest sites in five territories – Frog Canyon, North Chalone Peak, South Chalone Peak, and Eagle Rock – contained seven former nest sites observed in mid-winter through late spring, with no new greenery added to any of the nests.

Golden eagle nesting was confirmed at the Eucalyptus Grove. The nest site at the Eucalyptus Grove was used the past two years by a nesting eagle pair. The golden eagle pair was first observed at the Eucalyptus Grove on 23 January 2005, with incubation confirmed by 5 February. Two eaglets hatched at the Eucalyptus Grove nest by 5 March. One eagle was confirmed fledging between 19 May and 2 June 2005, with full fledge highly likely. Eagles were occasionally seen off the monument.

Red-tailed Hawks, *Buteo jamaicensis*

Six red-tailed hawk nesting pairs were documented this year – a new record for confirmed red-tailed hawk nests at the park – at historic nest sites at Hippo, Hand, and the Western Front, and at three previously undocumented territories: the West Side Entrance, the North Wilderness Trail, and Grassy Canyon. The new red-tailed hawk territories all had stick nests built in gray pines. Incubation was first observed at the Hand nest site on 9 April 2005, and at the Hippo nest site on 22 April. The Grassy Canyon, Western Front, and West Side Entrance nests were confirmed active later, after nestlings had hatched. The earliest confirmed hatching occurred at the Western Front nest from 23-25 April 2005, with the latest hatching of the season estimated at 22-24 May 2005 at the Hippo site. Nestlings were observed at all six nest sites, with 2 young each in the Hippo, Western Front, and North Wilderness Trail nests, 3 young in the West Side Entrance site, and 1 young each in the Hand and Grassy Canyon sites. Full fledging of young was confirmed at all nest sites, except the Grassy Canyon nest, where the hawk nestling likely failed to predation prior to fledging. Fledging was confirmed first at the Western Front nest on 9-10 June 2005, and the last fledglings flying from the Hippo nest late in the season, on 7-9 July 2005.

American Kestrels, *Falco sparverius*

Kestrels were observed occupying eleven territories in and just outside of the park this year, with evidence of nesting observed in five of the territories: South Wilderness Trail, Drywall, Marion Canyon, Neglected Valley, and the Eucalyptus Grove. Nest incubation was confirmed at Drywall on 1 May 2005, and at the Eucalyptus Grove on 5 May, 2005. Hatching was confirmed at nest sites in three territories: South Wilderness Trail (on 15 May 2005), Neglected Valley (on 18 May), and the Eucalyptus Grove (19 May). 3 fledglings each were confirmed at Marion Canyon

and Neglected Valley, with 1 fledgling confirmed (3 likely) at the Eucalyptus Grove. The South Wilderness Trail and Eucalyptus Grove nests were previously undocumented, and both located in trees, the former in an oak snag cavity, the latter in a stick construct on a eucalyptus tree. The Marion Canyon nest site was not confirmed, but was also likely in a tree cavity of either a live oak or a gray pine snag. Other kestrel pairs not confirmed nesting were active at South Wilderness Rock, McCabe Canyon, Frog Canyon, Scout Peak, Hawkins, and North Chalone Peak.

Red-shouldered Hawks, *Buteo lineatus*

Two pairs of red-shouldered hawks were documented in or near the park this year, along the South Wilderness Trail, and at the Pinnacles Campground. The South Wilderness Trail pair successfully nested and produced 3 hatchlings – the first confirmed breeding record for the park in 15 years – but the nest failed prior to fledging, likely due to predation. The South Wilderness Trail nest was a historic stick construct located on a sycamore tree, last used by red-shouldered hawks in 1990. Nest incubation was observed on 28 March 2005, with nestlings hatching on 29 April to 1 May 2005. The Pinnacles Campground pair aggressively defended the territory throughout the season; nesting was not confirmed, but 2 likely fledglings were observed with at least 1 red-shouldered hawk adult at the campground, on 30 June 2005.

Cooper's Hawks, *Accipiter cooperii*

Cooper's hawks were active in and near the park throughout the breeding season, and one previously undocumented nest was discovered along the Bench Trail, the first confirmed in the park in 13 years. The site was a stick construct on a live oak tree, located near the fire road access gate. 5 nestlings were observed, with an estimated hatch date of 27 May to 2 June 2005. The nest failed on 23-29 June 2005, likely due to predation, as any "branching" fledglings should have been very vocal and visible near the nest site. Although no nest site was confirmed, 3 Cooper's hawk fledglings were observed on 18 July 2005, perching together along the riparian corridor near the amphitheater at the Pinnacles Campground, and it is likely that a Cooper's hawk pair nested in the territory. Adult Cooper's hawks were also observed repeatedly near Neglected Valley to the Bear Creek Headwaters, and along the northern section of the South Wilderness Trail. Fifteen unconfirmed and inactive Cooper's hawk nests, located throughout the park, were photodocumented in mid- to late-July.

Sharp-shinned Hawks, *Accipiter striatus*

The 2005 breeding season marked the first active sharp-shinned hawk nests documented at the park in 5 years (with C. Fletcher documenting a nest in 2000), and only the 2nd and 3rd active nests ever confirmed in the park. Nesting pairs occupied territories at Upper Bear Gulch (near the Moses Spring trailhead) and in the South Wilderness near the foot of Frog Canyon. The Upper Bear Gulch nest was discovered during the nestling period, with 4 young estimated hatching on 4-7 June 2005, and fledging on 4-6 July 2005. The South Wilderness nest was discovered just after fledging, on 18 July 2005, with 4 young sharp-shinned hawks very localized near the nest site, and still receiving food exchanges from the adult pair. Both nests were stick constructs, conspicuously covered in feather down and whitewash, with the Upper Bear Gulch nest located on a live oak, and the South Wilderness nest located on a blue oak. Both nests were well-concealed in relatively dense, wooded groves. A third, non-nesting sharp-shinned hawk territory was documented in the Chalone Picnic Area, in the dense grove of live oaks between the Wet Lab and Trails Building. Although the accipiter pair was observed copulating and perching in the area, no active nest sites were confirmed. Sharp-shinned hawk adults were also observed near the Reservoir, the North Wilderness Trail junction along Old Pinnacles Trail, and in Lower Condor Gulch. Eight unconfirmed and inactive sharp-shinned hawk nests, located throughout the park, were photodocumented in mid- to late-July.

Owls

There were two records of owls nesting in PNM this season: a barn owl (*Tyto alba*) nest in D. Soto Canyon, documented as a barn owl roost the past 2 years; and observations of 3 recent long-eared owl (*Asio otus*) fledglings in Grassy Canyon. The barn owl pair in D. Soto Canyon began occupying the territory by 18 February 2005, and were observed incubating eggs by 25 March 2005. Four nestlings were confirmed within the nest site, with variable ages characteristic of barn owl young. Fledging of the barn owl young was not confirmed but was likely. Of note, the barn owl nest was about 5 meters distant from the prairie falcon nest in D. Soto Canyon. Despite the close proximity of the two nests, no aggressive interactions were observed between the owls and falcons, and the prairie falcon nest did succeed in fledging 2 young.

The long-eared owls – 3 fledglings and an adult – were first observed on 21 May 2005 in the live oak / gray pine grove in Grassy Canyon, at the fire road / Drywall road junction. By size, amount of remaining down, and small "ears," the owl fledglings were estimated to be 30-40 days old, with hatching estimated at 11-21 April 2005. No nest site was confirmed, though two old stick construct nests were documented in the grove. This is the first record of a successfully nesting long-eared owl pair in the park, with the last roosting pair confirmed in the park in 1994.

Great horned owls, *Bubo virginianus*, were heard vocalizing in Hanging Valley, near the base of Hippo in Upper Condor Gulch, in the Citadel area, and near the base of North Balconies. Pairs of western screech owls, *Otus kennicottii*, were heard calling near the Bear Gulch Visitor Center, andnear the slide walls in Canyon North of Willow Springs. Northern Pygmy-owls, *Glaucidium gnoma*, were heard vocalizing regularly in the Pinnacles Campground, and also documented in the park E of the Chaparral Ranger Station. Northern saw-whet owls, *Aegolius acadicus*, were heard vocalizing near the S. Wilderness Trail junction, and in the Pinnacles Campground near the overflow parking lot.

Other Raptors

Three pairs of white-tailed kites, *Elanus caeruleus,* were very active at the park, especially from March to May. The kite pairs occupied and defended specific territories, in the north section of the South Wilderness, in McCabe Canyon, and along the North Wilderness Trail near the head of Crowley Drainage. Successful nesting was not confirmed for any of the pairs, but all the kite pairs – particularly the South Wilderness and McCabe Canyon pairs – were observed courting, copulating, exchanging food, and attempting to build nest constructs in live oaks.

Northern harriers, *Circus cyaneus*, were observed soaring along Chalone Creek in the South Wilderness through April and May.

An adult bald eagle, *Haliaeetus leucocephalus*, was seen in Grassy Canyon on 4 March 2005, repeatedly stooping a juvenile California condor as it perched and attempted to take off in flight.

Two merlins, *Falco columbarius*, were seen soaring and circling near the California condor hacksite in mid-March.

Climbing Management Actions

Climbing advisories were put in place in January, and revised in March to reflect active, nesting prairie and peregrine falcon territories. Climbing advisories were put in place in areas with known climber usage to protect nesting raptors from disturbance. Signs detailing climbing advisories were posted at Little Pinnacles, Balconies, Hawkins, and Scout Peak territories. Other climbing advisory areas – detailed in press releases, trailhead signs, and pamphlets at the Bear Gulch Visitor Center – included Crowley Towers, Egg, Tunnel, Teapot Dome, Frog / Hand, and Goat Rock / Resurrection Wall territories. All of the above territories – except the Frog / Hand territory – were actively used and occupied by nesting falcon pairs.

Human Interactions

In general, climbers and hikers did an excellent job of heeding climbing / raptor advisories this year. However, there were six incidents of people entering advisory areas, a significant and disturbing rise compared to the very low number of hikers and climbers in advisory areas for the past 3 years. Perhaps the most substantial incidents were witnessed on North and General Balconies. Early in the breeding season, two to three hikers were observed on top of the first tier of General Balconies, and later in the season three visitors were observed parachuting off of General Balconies, disturbing the territorial prairie falcon and American kestrel pairs in the process. Although these BASE jumpers were apprehended and fined for their activities, it is highly likely that their actions were directly related to the failure of the Balconies prairie falcon pair to nest in the territory, for the first time in 17 years. Climbers were observed on Frog, where a climbing rope was left throughout the breeding season. This may have been a factor in the lack of occupation of the Frog / Hand territory by a prairie falcon pair throughout the season. Climbing incidents were also documented at Hawkins, where two climbers were seen on the west face of H& L Dome, and on Hand, where a rock cairn was assembled on top of the rock formation early in the season. One of the advisory signs – at Scout Peak – was stolen late in the season and was not recovered. Private planes and military helicopters were observed on numerous occasions below 100 feet within Little Pinnacles, Hawkins, Central High Peaks, and Balconies territories.

Prairie and peregrine falcon adults in the Goat, Crowley, and Hawkins territories did respond to the presence of hikers and raptor monitors by circling and wailing above their respective territories, but did not otherwise display significant and prolonged disturbance behavior threatening nest productivity and survivorship. When visitors adhere to them, the advisory signs for raptor area closures and postings at climbing accesses seem to be effective, given full fledging in all advisory territories except Little Pinnacles, where predation of the nest site was likely, and at Balconies, where the prairie falcon pair did not nest this season. However, increased visitor presence in advisory areas reflected lack of full compliance to posted advisories, and is of concern to resource protection in general and protection of raptor productivity in particular at PNM.

International Migratory Bird Day (14 May 2005) was celebrated at PNM with several interpretive talks and programs. On 14 May 2005, Raptor Monitor Gavin Emmons and Ranger Alacia Welch led birding walks in the Bench Trail to lower Chalone Creek area, documenting migrating and breeding raptors (including red-shouldered hawks), passerines, and near-passerines. Gavin Emmons also led a birding and raptor walk up D. Soto Canyon to observe barn owls and prairie falcons. Wildlife Biologist Jim Petterson interpreted peregrine falcon activity and nesting to visitors along the High Peaks Trail near Hawkins, and Diana Humple from Point Reyes Bird Observatory led a birding walk up Moses Spring Trail to the Reservoir. Ranger David Soto led an additional bird walk for visitor, monitoring species diversity near the Chaparral Parking Area on the west side of the park.

DISCUSSION / RECOMMENDATIONS

Prairie falcon nest phenology for the 2005 breeding season followed the average rates documented through the previous 18 years of monitoring. The earliest hatch date range for this year was late April (19-21 April 2005 at Pig Canyon), and the latest falcon fledge date was in mid June (9-11 June 2005 at Teapot Dome). Prairie falcon nesting this year also followed established success rates of fledglings produced per nest. From nine nest sites, the average rate of fledglings produced was 3.0, slightly lower than the 18-year average of 3.27. Two nest sites – at Narrows and Egg – produced 4 fledglings, with two further nests – at Drywall and Little Pinnacles – producing only 1 fledgling each. 3 nests failed to fledge full clutches of hatchlings, likely due to predation or nestlings falling out of nest sites, and one of the nest attempts – at the previously undocumented site of Tugboat – failed completely. Due to the lack of quantified data, it is difficult to determine specific factors leading to this rate of falcon breeding success and to falcon nest phenology this year in general. Unusually high rates of precipitation in January through April may have resulted in increased prey availability, providing falcons with greater food resources for nestlings, helping to explain the 100% success rate of prairie falcon nests. However, effects of prey availability may have been offset by the prolonged timing and intensity of the precipitation, which resulted in minor flooding throughout the park. It is likely that high precipitation this year – particularly during periods of falcon egg incubation – contributed to low numbers of eggs and nestlings this year. The deleterious effects of prolonged precipitation may have have been particularly acute for the eroded slide territories at Drywall (where only1 nestling was produced) and Willow Springs Slide / Canyon North of Willow Springs (where the prairie falcon pair did not nest this year), where many historic nest sites are more exposed to the elements than typical nest cavities on rock cliffs. Nest failure at Tugboat was likely due to abandonment by the falcon pair occupying the Mating Rocks and Tugboat territory. The fact that Tugboat has never been documented as a falcon nest, and that the falcon pair at Tugboat was still incubating by 28 May 2005 – very late in the season – may suggest that the prairie falcon pair was young or inexperienced. (See APPENDIX 3: 2005 Nest Phenology and Success – Falconids, for more details.)

Park visitors generally adhering to raptor advisories and not disturbing nest sites likely supported the fledgling success rates as well, allowing adults to focus on feeding and rearing of young rather than responding to human disturbances of nest sites. However, as noted above, off-trail hikers and climbers in advisory areas may have provided additional pressures discouraging prairie falcons from defense and nesting at certain territories; the Balconies prairie falcon pair failed to nest for the first time in 17 years, and the Frog territory – which produced a falcon fledgling successfully in 2004 – was unoccupied this year, as detailed above in the “Human Interactions” section. The disturbance of prairie falcons, and the incidents of off-trail hikers, climbers, and BASE jumpers in advisory areas, should be taken very seriously by park staff. A stricter adherence to park resource protection policies by law enforcement rangers in particular and park staff in general, would help ensure the reproduction of wild raptor species in the park. Increased interpretation of raptor sensitivity to disturbance by rangers, more consistent law enforcement patrol near advisory areas, and posting of more permanent signs throughout the High Peaks, would also help impress upon visitors their responsibilities at the park and provide education tools for respecting park goals and policies.

The raptor-monitoring season at PNM was unusual this year because of one species in particular: peregrine falcons. For the first time in 48 years, a peregrine falcon pair successfully nested – at the Hawkins territory – and produced 3 fledglings. A non-nesting peregrine falcon pair occupied the Hawkins territory in the 2004 breeding season, and it is likely that this pair overwintered at PNM – or at least in the vicinity of the park – returning to nest successfully in 2005. The adult male and female peregrine falcons were first observed this year in early January, and actively defended the Hawkins territory by stooping on condors, turkey vultures, and prairie falcons in the

High Peaks. A prairie falcon pair also occupied the Hawkins territory early in the breeding season, and was likely pushed out of the area by the peregrine falcon pair. The peregrine falcon pair was observed this year copulating, inspecting historic nest sites at Hawkins, and finally settling in to incubate 3 eggs. The peregrine falcon breeding phenology patterns this year were later than those of the prairie falcon pairs, with hatching in early May (2-5 May 2005) and fledging of young in mid-June (13-16 June 2005). Also of note, the adult male peregrine falcon was observed incubating eggs at the Hawkins nest for substantial periods of time, and more often than the female. (Generally in literature references, male peregrine falcons are described as incubating eggs for 25% of the total time, at most.) The "late" egg hatching and chick fledging, and the prolonged egg incubation by the male, may suggest that the female peregrine adult was still a young adult or an inexperienced breeder. The 3 peregrine falcon fledglings were still very active in the Hawkins Peak area as of 29 July 2005, engaging in aerial chases, stooping turkey vultures and California condors, and receiving prey items from the adult pair. The nesting success of the peregrine pair provides exciting evidence of the recovery and return of the species to Pinnacles National Monument, and hopefully the peregrine falcons will continue to nest at the park in the future.

This year also marked the release of the second cohort of captive-bred California condors at PNM, with up to 7 juvenile females and males flying in and near the park from January through the breeding season of nesting raptors. In 1982, the federally endangered California condor was represented by only 22 individuals. In 2003-2004, PNM became the most recent condor release site, as a part of a national recovery effort attempting to restore free-flying condor numbers throughout the United States. As juvenile females and males, the condors released at PNM were not potential breeders, but were often visible in the High Peaks and over Grassy Canyon, circling and perching. Several raptor species, including prairie and peregrine falcons, red-tailed hawks, and American kestrels, displayed territorial aggression by stooping condors flying near nest sites or in occupied territories, but no injuries were sustained to the condors.

The nesting season at PNM was also unusual this year in regards to the high number of new and historic nest sites, for falcons as well as other raptor species including Cooper's hawks, sharp-shinned hawks, red-shouldered hawks, red-tailed hawks, and American kestrels. Over the course of the breeding season, 20 prairie falcon territories were occupied by 14 falcon pairs, with 3 nesting sites newly documented (4% of 77 total prairie falcon nest sites historically), and 1 – the Drywall nest – used by falcons for the first time in 17 years. Six active red-tailed hawk nests – a park record for the amount of nesting territories active in a season – were documented, with 3 nests newly discovered, and fledglings confirmed from 5 nests (and the 6th nest failing to predation). 11 American kestrel territories were observed, with confirmed fledging of young documented in 3 territories.

With the exception of the breeding peregrine falcon pair at Hawkins, perhaps the most exciting nest records this year were documented for other raptor species at the park: sharp-shinned hawks, Cooper's hawks, red-shouldered hawks, long-eared owls, and barn owls. 2 new sharp-shinned hawk nests were discovered this year, only the 2nd and 3rd confirmed nests for the species on record at the park. Both nests successfully fledged 4 young each. A new Cooper's hawk nest was also discovered, but the 5 chicks in the stick construct were likely predated prior to fledging. Despite the nest failure, this was the first confirmed Cooper's hawk nest at the park in 13 years. A group of 3 Cooper's hawk fledglings was also documented in the Pinnacles Campground, along the riparian corridor of Sandy Creek near the amphitheater, and it is likely that the young hawks fledged from the area, though a nest site was not confirmed. In July 2005, a comprehensive cataloging of potential accipiter nest sites was conducted throughout the park, with 8 potential sharp-shinned hawk nests and 15 possible Cooper's hawk nests photodocumented. As both accipiters are species of special concern in California, the confirmed and potential nest records are especially significant, and help to build a base of confirmed accipiter nesting areas for future raptor monitors to observe.

A red-shouldered hawk nest was also documented near the South Wilderness Trail, representing the first confirmed record of red-shouldered hawk breeding in the park in 15 years. 3 hawk nestlings were observed in the stick construct, but the nest failed prior to fledging, likely due to predation. A red-shouldered hawk pair was observed at the Pinnacles Campground throughout the breeding season, aggressively defending the territory, and 2 red-shouldered hawk fledglings were observed with an adult in June and July 2005. Though a nest site was not confirmed, it is highly likely that the adult red-shouldered hawk pair did successfully nest in the area.

2 records of owl breeding were also recorded in the park this year. 3 recent long-eared owl fledglings were observed with an adult owl in Grassy Canyon, and almost certainly fledged from the oak / pine grove at the fire road / Drywall road junction. This record is also very significant, representing the first confirmed long-eared owl breeding success at PNM in 19 years of raptor monitoring efforts, a hopeful sign for this sensitive species of concern. A barn owl nest with at least 4 nestlings was also confirmed in D. Soto Canyon, the first confirmed barn owl nest in the park in 9 years.

Although no active nest sites were confirmed, 3 white-tailed kite territories were documented in the park this year, with courtship behavior, copulation, and nest-building attempts observed in the South Wilderness and McCabe Canyon territories. All of the territories were focused along riparian corridors, with nest-building attempts in live oaks. Given the lack of historic data on kite behavior and activity in the park, these observations are significant, despite the lack of confirmed nest records this year.

10 species of breeding raptors and 28 active nests (in addition to 6 active common raven nests) were confirmed in or near the park this year, a marked rise over the usual 4 to 5 species of raptor species observed nesting in a given year, and the highest nesting species diversity on record for the 19-year raptor monitoring project. Although certain factors, such as prey availability, lack of human disturbance, low temperatures, and high precipitation through May, were likely significant in determining the high number of nesting raptor species and sites documented this year, I believe that the experience, training, and efforts of the raptor monitor and of other park staff played more essential roles. The survey protocols in place at PNM worked well and provided the raptor monitor with a comprehensive framework for documenting the priority raptor species – prairie falcons, peregrine falcons, and golden eagles – as well as "non-target" species such as red-tailed hawks, American kestrels, accipiters, and owls. Park staff conducting fieldwork in the backcountry of PNM, including the pig eradication crew, exotic plant management crew, interpretive rangers, and biological technicians, also provided excellent reports on raptor activity and nesting that allowed for the documentation of new nest sites and territories, and the more effective monitoring of non-sensitive raptor species including red-tailed hawks and white-tailed kites, throughout the breeding season.

Several aspects of the raptor monitoring program at PNM have worked particularly well this year and should be emphasized. The raptor monitor returned for a 3rd consecutive season this year, and his past experience as a monitor and prior knowledge of raptor territories and watchspots was no doubt reflected in the number and diversity of breeding raptor species and nests documented at the park in 2005. The importance of having an experienced raptor monitor over multiple seasons cannot be stressed enough, and can significantly broaden the scope of nesting species and sites recorded within a particular breeding season. Creating a permanent raptor monitoring position at the park, or at least a secure term position with housing available near the park, would provide a strong impetus for wildlife technicians to return to the position from year to year. Given the 19 consecutive years of data collected for the project, and the priority that the park and Resource Management department have placed on the project, such a position seems justified. Given the inevitability of changing raptor monitors in certain years, having access to an experienced or prior raptor monitor – on staff as a half-time position through the first half of the breeding season –

would help to orient the current raptor monitor to the specifics of the project that cannot be as easily conveyed through the Raptor Monitoring Protocol and existing database resources.

The raptor monitor was also assisted regularly in the field by Ranger Alacia Welch, after she was trained this season and last season in the standardized procedures for raptor monitoring field work. This assistance helped significantly to alleviate the time constraints necessitated by the park management focus on prairie falcons and golden eagles, and the high-use, raptor advisory areas, and allowed for more detailed coverage of "non-target" raptor species in the park. Continuing to have a resource staff "half-position," trained and supervised directly by the raptor monitor, would allow for consistent monitoring data, adherence to survey protocols, and greater coverage of nesting raptors in the park. Additionally, I would offer the following recommendations for incoming raptor monitors.

Continuing to make use of the efforts and enthusiasm of staff and visitors observing raptor activity in the field would allow for the broader documentation of nesting raptor species and nests seen this year. This could be achieved through regular communication with park staff and visitors, bi-weekly monitoring updates on raptor status at the park, and reminders on filling out wildlife observation cards. Second, more detailed training and information on accipiters, red-shouldered hawks, kites, owls, and kestrels should be made available to raptor monitors and other park staff. Literature on nesting habits, observation methodologies, and nesting phenology for these species would be beneficial, as would basic instruction provided by organizations such as GGRO (Golden Gate Raptor Observatory), Hawkwatch International, or PRBO (Point Reyes Bird Observatory). Raptor monitors should also make use of historic raptor monitoring field notes, cataloged photographs, and GPSed watchspots for these species. Finally, monitors should be very familiar with the standardized written set of raptor protocols, and these should be revised and edited on a regular basis. In particular, incoming monitors should thoroughly review the following: raptor monitoring techniques; raptor identification skills; navigation and orientation in the park backcountry; appropriate use of GPS and monitoring equipment; backcountry safety skills; management of raptor advisory areas; raptor monitoring ArcMap projects and geographic locations of nest sites and watchspots; and guidelines for database management of field notes, wildlife observation cards, and archived nest site photographs, for both confirmed and possible nest sites.

In regards to effective monitoring and a standardized set of protocols, two key aspects of raptor monitoring deserve further discussion because they are difficult to quantify but are essential for providing the monitor with successful data on nesting phenology – timing of raptor observations, and ideal locations for watching nests. Both factors vary as the breeding season proceeds and ultimately require self-motivation, adaptability, and a sensitivity to gaining effective data on the part of the raptor monitor. For the 2005 prairie falcon breeding season, I found that afternoon and evening surveys were ideal in winter when determining where falcons would roost for the night, and in locating potential eyries. The falcons were most active about two to three hours before sunset, and circled and perched visibly – occasionally inspecting potential nest sites - in their respective territories before retreating to sleeping roosts for the night. Evening surveys also had the benefit of providing initial data on locations of vocalizing owls within the park. As the season proceeded, I found that it was useful to check on nest sites in specific territories at different times of the day. Nestlings seemed most active near sunrise and sunset, but even observations during the high temperatures of midday provided useful data on nestling numbers while adults were out hunting. Near fledging, falcon and other raptor young seemed most active from sunrise to 1000 hours, when they were most consistently practice-flapping and later flying and perching near the nest sites. Depending on the aspect of nest sites, morning and evening lighting provided varying levels of visibility into the nests, as well. As stated above, my recommendation would be that raptor monitors cultivate a philosophy and work attitude of adaptability to the timing of observations, observing raptor activity in response to the particular physical and behavioral conditions at a given nest territory.

The same general recommendations would apply to locating effective observation points for monitoring raptor territories and nest sites; remaining attentive to the behavior and movement of falcons and other raptors within given territories, raptor monitors should be adaptable to moving to different vantage points within nesting territories to most effectively observe raptor behavior and nesting phenology. Based on 19 years of data, the raptor monitoring protocol, photo points, and GPS coordinates for watch spots over the past three years, raptor monitors should have the basic framework necessary to set up observation points as dictated by the behavior and nest selection of given raptor pairs and young in nest sites. This standardized framework, in combination with a flexibility to the physical and behavioral conditions within a specific nest territory, should allow the raptor monitor to consistently and effectively observe raptor nesting throughout the breeding season.

In regards to raptor monitoring at the park, I would offer several further recommendations. Historically, the raptor monitoring project has focused on managing for the protection of cliff-nesting raptors, particularly prairie falcons and golden eagles, because they are species of concern in California. The standardization of raptor monitoring procedures and raptor advisories, and effective communication with hikers and climbers at the park, has helped to ensure the continuing breeding success of prairie falcons and golden eagles, and the return of breeding peregrine falcons to the park. However, three sensitive species of concern in California – Cooper's hawks, sharp-shinned hawks, and long-eared owls – have received little monitoring attention historically, despite the confirmation of active nesting for all of these species in the park this year and in the past. These three raptor species all tend to reproduce along riparian corridors, where many of the park trails are located, and potential disturbance of nest sites by visitors should be studied further. As the staff at PNM prepare for the acquisition of the Pinnacles Ranch and Kingman property land extending out to Highway 25, the need for further monitoring of forest and woodland nesting raptors becomes even more important, because much of this new park property contains riparian corridors and oak/pine woodlands suitable for accipiter and long-eared owl nesting habitat. Allocating funds for an additional raptor monitoring position focused on accipiter and long-eared owl monitoring would allow the visitor impacts on these species to be documented more clearly, and would help justify seasonal closures of riparian and woodland areas determined to be essential nesting habitat for the accipiters and owls.

The acquisition of the Kingman property may provide the park with nesting habitat for another raptor species: burrowing owls. This owl species is also listed as a sensitive species of concern in California, with populations in this region – near the San Francisco Bay and the Central Valley – declining steeply in recent years. Burrowing owls may inhabit the rangeland and fields between the Pinnacles Campground and Highway 25, and this property should be inventoried for their presence prior to management decisions for the acquired land. The nest burrows for this species are visible, with prey matter, feathers, and cow manure decorating the entrances to active burrows clearly. I would recommend funding for a biological science technician position to document for presence of active burrowing owl burrows in acquired rangeland habitat. Alternatively, the raptor monitor's position could be extended through August or September, as active burrows will likely produce fledgling owls in July, which should perch very visibly near burrows. This would at least provide preliminary evidence of burrowing owl presence or absence in the park.

I would also recommend the color banding of the entire prairie falcon population as a possibility. Color banding of falcons in the park would provide much more extensive information on the raptors, including individual movements of single and paired falcons within breeding seasons and from year to year, rates on short- and long-term pair bonds, rates of birds returning to nest in the park annually, loyalty of individual falcons to specific territories, and fledgling survivorship and dispersal. Color banding could provide a valuable tool for continuing to broaden our experience and understanding of the prairie falcons as a sensitive species, a management concern for the park, and an amazing bird of prey that returns to breed at the park annually.

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This project would not be as successful as it is without the eyes and ears of helpful PNM employees. Therefore, I would like to thank the park employees for their help, encouragement, and passion for the raptors and wildlife diversity at PNM. I would also like to extend my appreciation to the park visitors, for their reports and observations on raptor sightings in the park, and for their appreciation and value of the importance of monitoring, managing, and protecting the nesting sites and breeding productivity of raptors in the park.

In particular, I would like to thank Rob Saulino and Sara Bartel for helping to confirm new red-tailed hawk nest sites and territories. Rob Saulino and Jennifer Tiehm also contributed valuable observations on white-tailed kite territories and pair behavior in the park. I would also like to thank Jason Herynk for his time and effort in managing the raptor monitoring databases and GIS data, and Jim Petterson for his consistent support of and trust in my work as a raptor monitor. I also thank Jim Petterson and Carl Bremer for their coordination of the International Migratory Bird Day events and programs, and Erika Williams for her efforts in detailing accurate raptor / climbing advisories and the organization of the park bird checklist. The following staff shared their experience, excitement, and observations of raptors with me throughout the season, granting me a more complete picture of raptor breeding and diversity at the park, and assisted in the effective management of raptor advisory areas: David Soto, Paul Radley, Court Van Tassel, Tom Leatherman, Jennifer Tiehm, Alacia Welch, Lisa Smith, and Wendy Artz.

Ranger Alacia Welch also deserves my sincere thanks and gratitude for assisting me regularly in observations of raptor territories, finding several previously undocumented nest territories, her skill in seeing and hearing raptor breeding behavior in falcon, accipiter, and red-tailed hawk territories, and her help in confirming occupation and fledging status of territories through team monitoring efforts.

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APPENDIX 1

This season's full-time Raptor Monitor was Gavin Emmons, assisted by SCA intern Alacia Welch. Welch assisted regularly in team watches at large territories, and during the fledging of young at multiple territories on the same days. Park employee volunteers and staff assisted me in the field as needed.

The total number of observation hours by staff was 987 hours. Volunteers' observation hours totaled 66. Total time in the field was 1053 hours.

APPENDIX 2

Through the course of the 2005 season, several changes were made to raptor monitoring databases, and relevant sections in the Raptor Monitoring Protocol will be revised accordingly. These are listed here as general raptor monitoring metadata, as "works in progress" that have not been finalized.

Perhaps most significantly, the "raptorindex.FP5" database has been completely transferred to MS Access format. Fundamentally, the data entry form records the same information as was collected in the FileMaker Pro database, but with the addition of certain fields, including observation limits, precipitation, cloud cover percentage, wind speed, high / low temperatures, etc. New tables for raptor watchspots and for possible but unconfirmed nest sites have also been incorporated into the "switchboard" for the database. The transfer process from FileMaker to Access will be detailed further in revised data management sections of SOP #9 in the Raptor Monitoring Protocol. A Word document, "metadata_raptorindex," was created to detail missing records or information in the "raptorindex" database, and to describe some of the conversion changes to MS Access format.

Traditionally, photo documentation of Pinnacles territories has been archived in the "photolog" and "divlog" Word documents. Because the photo information is most conducive to a database structure, the information in these files has been transferred fully into a FileMaker database, "Photolog.FP5," contained in the "databases" folder in the "Breeding Raptors" folder. Information on this change will be added to SOP 9: Data Management, now that the "Photolog" database has been finalized.

All records from the "breedingraptors-PRE 2000.FP5" database were transferred to the current "breedingraptors.FP5" database in 2004 to assure consistency in the records, species, and territorial names. An additional field, territorial links, was created to detail raptor pairs occupying more than one territory in a season. A Word document, "metadata_breedingraptors," was created to detail these changes, to address missing historic records still needing documentation in the database, and to address potential problems with conversion to MS Access. The "breedingraptors.FP5" database will be exported into MS Access format in 2005-06, to link this database with the MS Access "raptorindex" database, with SOP #9 revised accordingly.

The sections on GPS and GIS layers in SOP #9 will be revised in the future to reflect a more standardized approach to information that is currently being developed. In particular, the section on the "raptornest.apr" ArcView project will be revised to reflect conversion from ArcView to ArcMap software in the park. A dataset for possible but unconfirmed nest sites has also been developed under the title, "Obs Points For Poss Nests.dbf," and will be detailed in a revision of SOP #9. Off-trail routes to remote watchspots have been GPSed, and unique identifier codes for watchspots are being developed.

APPENDIX 3: 2005 Nest Phenology and Success – Falconids

Nest Species	Territory Occupied	Nest Code	Arrival Date	Begin Incub.	Hatch Date	Fledge Date	Abandon Date	Failed Date	# of Eggs	# of Chicks	Known Fledglings	Possible Fledglings	Occup. Status
PRFA	Drywall	DRY-2	<1/16	<3/28	4/28-30	6/9-11				1	1	1	1
PRFA	D. Soto Canyon	DS-2	<2/9	<3/25	4/21-22	6/2-3				5	2	2	2
PRFA	Willow Springs Slide	*CNWS	<1/24				<5/23						Occupied
PRFA	Cyn N of Willow Spgs	*WSS	<1/24				<5/23						Occupied
PRFA	Narrows	NARR-2	<3/23	<4/14	4/20-23	6/1-3				5	4	4	4
PRFA	Pig Canyon	PIG-3	<1/20	<4/1	4/19-21	5/31-6/2				3	3	3	3
PRFA	Little Pinnacles	LP-2	<1/15	<3/30	4/25-29	6/7-9				2	1	1	1
PRFA	Frog / Hand												Not Occ.
PRFA	Scout Peak	*GOAT	<1/30										Occupied
PRFA	Prescribed Burn Cliffs												Not Occ.
PRFA	Goat / Resurrection	GOAT-2	<1/30	3/18-26	4/27-28	6/8-9				3	3	3	3
PRFA	Teapot Dome	*EGG	<2/25										Occupied
PRFA	Hawkins		<1/12				2/28-3/1						Occupied
PRFA	Egg	EGG-1	<2/25	<3/26	4/25-28	6/6-8			4	4	4	4	4
PRFA	Mating Rocks	*TUG	<2/10										Occupied
PRFA	Tugboat	TUG-1	<2/10	<4/11				5/29-6/16	⩾1				Failed
PRFA	Crowley	CT-1	1/14-22	<3/31	4/23-24	6/4-5				3	3	3	3
PRFA	North Balconies	*SGB/MAC	<1/23										Occupied
PRFA	South Balconies	*NB/MAC	<1/23										Occupied
PRFA	Machete	*NB/SGB	<1/23										Occupied
PRFA	North Chalone	NC-4	<1/25	<3/27	4/27-29	6/8-10				4	3	3	3
PRFA	South Chalone		<4/24				<6/1						Occupied
PEFA	Hawkins	HP-1	<1/12	3/26-30	5/2-5	6/13-16			3	3	3	3	3
AMKE	S Wilderness – S End	*SWT											Occupied
AMKE	South Wilderness Rock		<2/26										Occupied
AMKE	South Wilderness Trail	SWT-3			<5/15					⩾1			Occupied
AMKE	Drywall	DRY-3	<1/18	<5/1					⩾1				Occupied
AMKE	McCabe Canyon		<3/2										Occupied
AMKE	Marion Canyon		<3/23			<5/25				⩾3	3	3	3
AMKE	Neglected Valley	NV-2	<2/1		<5/18	<6/9				⩾3	3	3	3
AMKE	Hawkins		<1/12										Occupied
AMKE	South Balconies		<2/5										Occupied
AMKE	North Chalone		<2/18										Occupied
AMKE	Eucalyptus Grove	EG-5	<1/23	<5/5	<5/19	<6/2				⩾3	1	3	3

(Note: for the **"Occup. Status"** column, # refers to possible fledglings, "Occupied" = non-nesting occupation, "Not Occ." = no occupation, "Failed" = failed nest. For the **"Nest Code"** column, * refers to territorial links for raptor pairs occupying more than one territory.)

APPENDIX 4: 2005 Nest Phenology and Success – Eagles, Buteos, Accipiters, Kites, Owls, Corvids

Nest Species	Territory Occupied	Nest Code	Arrival Date	Begin Incub.	Hatch Date	Fledge Date	Abandon Date	Failed Date	# of Eggs	# of Chicks	Known Fledglings	Possible Fledglings	Occup. Status
GOEA	Eucalyptus Grove	EG-3	<1/23	<2/5	<3/5	~5/19-6/2				2	1	2	2
RTHA	Grassy Canyon	GC-1	<3/16		5/15-19			6/21-28		1	0	0	Failed
RTHA	North Wilderness Trail	NWT-1		<4/17	5/3-4	6/18-19				2	2	2	2
RTHA	Frog / Hand	HAND-1	<2/1	<4/9	5/3-6	6/20-21				1	1	1	1
RTHA	Western Front	WF-1	<1/29		4/23-25	6/9-10				2	2	2	2
RTHA	Lower Condor Gulch	*UCG	<1/12										Occupied
RTHA	Upper Condor Gulch	HIPPO-1	<1/12	<4/22	5/22-24	7/7-9				2	1	2	2
RTHA	West Side Entrance	WSE-1			4/27-29	6/13-15				3	3	3	3
RSHA	Pinnacles Campground		<1/18									2	2
RSHA	South Wilderness Trail	SWT-1	<3/28	<3/28	4/29-5/1			5/28-6/12		3	0	0	Failed
RSHA	S Wilderness – N End	*SWT	<3/28										Occupied
COHA	Bench Area	BA-1			5/27-6/2			6/23-29		5	0	0	Failed
SSHA	S Wilderness – N End	SWN-1				<7/18				4	4	4	4
SSHA	Chalone Picnic Area		<6/5										Occupied
SSHA	Upper Bear Gulch	UBG-1			6/4-7	7/4-6				4	4	4	4
WTKI	S Wilderness – N End		<3/11										Occupied
WTKI	McCabe Canyon		<5/13										Occupied
WTKI	North Wilderness Trail		<3/27										Occupied
BAOW	D. Soto Canyon	DS-3	<2/18	<3/25						4	0	4	4
LEOW	Grassy Canyon				~4/11-21	~5/11-16				3	3	3	3
GHOW	Hanging Valley		<1/15										Occupied
GHOW	Upper Condor Gulch		<2/8										Occupied
GHOW	Citadel		<1/23										Occupied
GHOW	Crowley Drainage		<3/8										Occupied
WESO	Cyn N of Willow Spgs		<2/16										Occupied
WESO	Headquarters		<2/8										Occupied
CORA	Drywall	DRY-9	<1/18	<3/28	<5/1	>5/21				3	0	3	3
CORA	D. Soto Canyon	DS-4	<4/9		<5/11					≥1	0	⩾1	⩾1
CORA	Cyn N of Willow Spgs	CNWS-3	<1/24		~4/25-30					3	0	3	3
CORA	Prescribed Burn Cliffs												Occupied
CORA	Hawkins		<1/12										Occupied
CORA	Crowley Drainage		<1/22		<5/11								Occupied
CORA	South Balconies	SGB-10	<3/17	<4/5	<5/5	5/20-28				4	4	4	4
CORA	NE Sec 15	NES-1	<4/15	<4/25	<5/22						2	3	3

(Note: for the **"Occup. Status"** column, # refers to possible fledglings, "Occupied" = non-nesting occupation, "Not Occ." = no occupation, "Failed" = failed nest. For the **"Nest Code"** column, * refers to territorial links for raptor pairs occupying more than one territory.)